# Gautam lyer

Associate Professor

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### Personal Data.

#### Employment.

- 2015-present Associate Professor (tenured), Mathematical Sciences, Carnegie Mellon University.
  - 2009–2015 Assistant Professor, Mathematical Sciences, Carnegie Mellon University.
  - 2006–2009 Szegö Assistant Professor, Mathematics, Stanford University.

#### Education.

- 2006 Ph.D. in Mathematics, University of Chicago.
  Thesis adviser: Peter Constantin.
  Dissertation title: A stochastic Lagrangian formulation of the Navier-Stokes and related transport equations.
- 2001 M.S. in Mathematics, University of Chicago.
- 1999 B.Sc. in Mathematics, St. Xaviers's College, Mumbai.

# Awards and Fellowships

#### Grant Support.

I am the sole PI of all grants listed here. There are no Co-PI's.

- 2013–2018 NSF DMS-1252912, CAREER: Anomalous Diffusion, Homogenization and Averaging.
- 2010–2013 **NSF DMS-1007914**, A probabilistic approach to the Navier-Stokes equations.
- 2007–2010 **NSF DMS-0707920**, *A stochastic Lagrangian approach to non-linear transport equations*. Research Fellowships.
  - 2013 Alfred P. Sloan Research Fellow.
- 1999–2000 **McCormick Fellowship**, *University of Chicago*. Teaching Prizes.
  - 2003 Wayne C. Booth Graduate student prize, University of Chicago. Excellence in teaching
  - 2003 Lawrence and Josephine Graves Teaching Prize, University of Chicago. Best record in effective and responsible teaching

#### Academic Honors.

- 1999 H. M. Mehta (Bar-at-law) Memorial Scholarship. Highest aggregate in Mathematics in the Third Year B.Sc. exams.
- 1999 **Bujor Kaikobad Doctor Memorial Prize**. Highest aggregate in Mathematics and securing a First Class in the Third Year B.Sc exams.

### Publications.

In mathematics authors are always listed alphabetically.

Published Articles.

 G. Iyer and A. Novikov, Anomalous diffusion in fast cellular flows at intermediate time scales, Probab. Theory Related Fields (2014), to appear, available at arXiv:1406.3881.

- [2] G. Iyer, X. Xu, and A. D. Zarnescu, Dynamic Cubic Instability in a 2D Q-tensor Model for Liquid Crystals, Math. Models Methods Appl. Sci. (2014), to appear, available at arXiv:1406.4571.
- [3] G. Iyer, A. Kiselev, and X. Xu, Lower bounds on the mix norm of passive scalars advected by incompressible enstrophy-constrained flows, Nonlinearity **27** (2014), 973. (Featured article.)
- [4] M. Ignatova, G. Iyer, J. P. Kelliher, R. L. Pego, and A. D. Zarnescu, Global existence for two extended Navier-Stokes systems, Commun. Math. Sci. (2014), to appear, available at arXiv:1308.4735.
- [5] G. Iyer, R. L. Pego, and N. Leger, Limit theorems for Smoluchowski dynamics associated with critical continuous-state branching processes, Ann. Appl. Probab. (2014), to appear, available at arXiv:1212.6451.
- [6] G. Iyer, T. Komorowski, A. Novikov, and L. Ryzhik, *From homogenization to averaging in cellular flows*, Ann. Inst. H. Poincaré Anal. Non Linéaire (2014), to appear, available at arXiv:1108.0074.
- [7] G. Iyer and K. C. Zygalakis, Numerical studies of homogenization under a fast cellular flow, SIAM Multiscale Model. Simul. 10 (2012), no. 3, DOI 10.1137/120861308.
- [8] G. Iyer, R. L. Pego, and A. D. Zarnescu, Coercivity and stability results for an extended Navier-Stokes system, J. Math. Phys. 53 (2012), no. 11, 115–605, DOI 10.1063/1.4738637.
- P. Constantin and G. Iyer, A stochastic-Lagrangian approach to the Navier-Stokes equations in domains with boundary, Ann. Appl. Probab. 21 (2011), no. 4, 1466–1492, DOI 10.1214/10-AAP731. MR2857454
- [10] G. Iyer, A. Novikov, L. Ryzhik, and A. Zlatoš, *Exit times of diffusions with incompressible drift*, SIAM J. Math. Anal. 42 (2010), no. 6, 2484–2498, DOI 10.1137/090776895. MR2733257
- [11] G. Iyer and A. Novikov, The regularizing effects of resetting in a particle system for the Burgers equation, Ann. Probab. 39 (2011), no. 4, 1468–1501, DOI 10.1214/10-AOP586. MR2857247
- P. Constantin, G. Iyer, and J. Wu, Global regularity for a modified critical dissipative quasi-geostrophic equation, Indiana Univ. Math. J. 57 (2008), no. 6, 2681–2692, DOI 10.1512/iumj.2008.57.3629. MR2482996 (2009k:35120)
- G. Iyer and J. Mattingly, A stochastic-Lagrangian particle system for the Navier-Stokes equations, Nonlinearity 21 (2008), no. 11, 2537–2553, DOI 10.1088/0951-7715/21/11/004. MR2448230 (2009h:76060)
- [14] G. Iyer, A stochastic Lagrangian proof of global existence of the Navier-Stokes equations for flows with small Reynolds number, Ann. Inst. H. Poincaré Anal. Non Linéaire 26 (2009), no. 1, 181–189, DOI 10.1016/j.anihpc.2007.10.003. MR2483818
- [15] P. Constantin and G. Iyer, Stochastic Lagrangian transport and generalized relative entropies, Commun. Math. Sci. 4 (2006), no. 4, 767–777. MR2264819 (2009a:60073)
- G. Iyer, A stochastic Lagrangian formulation of the Navier-Stokes and related transport equations, Ph. D. Thesis, University of Chicago, 2006.
- [17] P. Constantin and G. Iyer, A stochastic Lagrangian representation of the three-dimensional incompressible Navier-Stokes equations, Comm. Pure Appl. Math. 61 (2008), no. 3, 330–345, DOI 10.1002/cpa.20192. MR2376844 (2009b:35319)
- G. Iyer, A stochastic perturbation of inviscid flows, Comm. Math. Phys. 266 (2006), no. 3, 631–645, DOI 10.1007/s00220-006-0058-5. MR2238892 (2007e:76051)
- [19] G. Iyer, Transport in viscous rotating fluids, Commun. Math. Sci. 2 (2004), no. 4, 673–684. MR2119933 (2005k:76136)
- [20] G. Iyer, Continuous Vector Products in  $\mathbb{R}^n$ , The Bombay Mathematics Colloquium Bulletin (1998), [Undergraduate publication].

#### Preprints.

These have been submitted to peer-reviewed journals for publication.

[21] G.-M. Gie, C. Henderson, G. Iyer, L. Kavlie, and J. P. Whitehead, Stability of Vortex Solutions to an Extended Navier-Stokes System (2014), preprint, available at arXiv:1411.5773.

## Miscellaneous

2013–2014 SIAM Student Chapter Faculty Adviser AMS and SIAM member US citizen, and OCI (Overseas Citizen of India)